

PENDING CLAIMS

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1. An absorbent composite, comprising a fibrous matrix containing absorbent material,
wherein the fibrous matrix comprises bonded cellulosic fibers, wherein the fibrous matrix includes voids and passages between voids within the matrix;
wherein the absorbent material is located within some of the voids; and
wherein the absorbent material located within the voids is expandable into the voids.
2. The composite of Claim 1 wherein the fibrous matrix comprises fibers selected from the group consisting of resilient fibers, matrix fibers, and mixtures thereof.
3. The composite of Claim 1 further comprising a wet strength agent.
4. The composite of Claim 2 wherein the resilient fibers are selected from the group consisting of chemically stiffened fibers, anfractuous fibers, chemithermomechanical pulp fiber, prehydrolyzed kraft pulp fibers, synthetic fibers, and mixtures thereof.
5. The composite of Claim 4 wherein the chemically stiffened fibers comprise crosslinked cellulosic fibers.
6. The composite of Claim 5 wherein the crosslinked cellulosic fibers are crosslinked with a crosslinking agent selected from the group consisting of urea-based and polycarboxylic acid crosslinking agents.

7. The composite of Claim 4 wherein the synthetic fibers are selected from the group consisting of polyolefin, polyester, and polyamide fibers.

8. The composite of Claim 7 wherein the polyester fibers are polyethylene terephthalate fibers.

9. The composite of Claim 1 wherein the matrix fibers comprise cellulosic fibers.

10. The composite of Claim 9 wherein the cellulosic fibers comprise fibers selected from the group consisting of wood pulp fibers, cotton linters, cotton fibers, hemp fibers, and mixtures thereof.

11. The composite of Claim 2 wherein the resilient fibers are present in the composite in an amount from about 5 to about 60 percent by weight of the total composite.

12. The composite of Claim 2 wherein the matrix fibers are present in the composite in an amount from about 10 to about 60 percent by weight of the total composite.

13. The composite of Claim 1 wherein the absorbent material is a superabsorbent material.

14. The composite of Claim 13 wherein the superabsorbent material is selected from the group consisting of superabsorbent particles and superabsorbent fibers.

15. The composite of Claim 1 wherein the absorbent material is present in an amount from about 5 to about 60 percent by weight of the total composite.

16. The composite of Claim 1 wherein the absorbent material is present in about 40 percent by weight of the total composite.

17. The composite of Claim 1 wherein the absorbent material absorbs from about 5 to about 100 times its weight in 0.9 percent saline solution.
18. The composite of Claim 3 wherein the wet strength agent is a resin selected from the group consisting of polyamide-epichlorohydrin and polyacrylamide resins.
19. The composite of Claim 3 wherein the wet strength agent is present in the composite in an amount from about 0.01 to about 2 percent by weight of the total composite.
20. The composite of Claim 1 having a basis weight of from about 50 to about 1000 g/m².
21. The composite of Claim 1 having a density of from about 0.02 to about 0.7 g/cm³.
22. The composite of Claim 1 wherein the composite is formed by a wet-laid process.
23. The composite of Claim 1 wherein the composite is formed by a foam process.
24. The composite of Claim 5 wherein the crosslinked cellulosic fibers are present in about 12 percent by weight based on the total weight of the composite.
25. The composite of Claim 10 wherein the wood pulp fibers are present in about 48 percent by weight based on the total weight of the composite.
26. The composite of Claim 13 wherein the absorbent material is present in about 40 percent by weight based on the total weight of the composite.
27. The composite of Claim 18 wherein the polyamide-epichlorohydrin resin is present in about 0.5 percent by weight based on the total weight of the composite.
28. An absorbent article comprising the composite of Claim 1.

29. The absorbent article of Claim 28 wherein the article is a diaper.
30. The absorbent article of Claim 28 wherein the article is a feminine care product.
31. The absorbent article of Claim 28 wherein the article is an adult incontinence product.
32. A method for forming an absorbent composite, comprising the steps of:
combining resilient fibers, matrix fibers, and absorbent material in a dispersion medium to form a fibrous slurry;
depositing the fibrous slurry on a foraminous support to form a wet composite; and
drying the wet composite to form an absorbent composite comprising a fibrous matrix and absorbent material,
wherein the fibrous matrix defines voids and passages between voids distributed substantially throughout the matrix;
wherein the absorbent material is located within some of the voids; and
wherein the absorbent material located within the voids is expandable into the voids.
33. The method of Claim 32 wherein the resilient fibers comprise crosslinked cellulosic fibers.
34. The method of Claim 32 wherein the matrix fibers comprise wood pulp fibers.
35. The method of Claim 32 wherein the absorbent material comprises a superabsorbent material.
36. The method of Claim 32 wherein the absorbent material is swellable in the dispersion medium.

37. The method of Claim 32 wherein the absorbent material absorbs less than about 20 times its weight in the dispersion medium.

38. The method of Claim 32 wherein the fibrous slurry further comprises a wet strength agent.

39. The method of Claim 38 wherein the wet strength agent is a polyamide-epichlorohydrin resin.

40. The method of Claim 32 wherein the dispersion medium comprises water.

41. The method of Claim 32 wherein the dispersion medium further comprises a surfactant.

42. The method of Claim 41 wherein the surfactant is selected from the group consisting of ionic, nonionic, and amphoteric surfactants.

43. The method of Claim 32 wherein the fibrous slurry has a consistency of from about 0.05 to about 15 percent solids by weight.

44. The method of Claim 32 wherein the method is a wet-laid method.

45. The method of Claim 32 wherein the method is a foam method.

46. A method for forming an absorbent composite, comprising the steps of:
combining resilient fibers and matrix fibers in a first dispersion medium to form a first fibrous slurry;

combining absorbent material with a second dispersion medium to form an absorbent material slurry;

combining the absorbent material slurry with the first fibrous slurry to provide a second fibrous slurry;

depositing the second fibrous slurry on a foraminous support to form a wet composite;
and

drying the wet composite to form an absorbent composite comprising a fibrous matrix
and absorbent material,

wherein the fibrous matrix defines voids and passages between voids distributed
substantially throughout the matrix;

wherein the absorbent material is located within some of the voids; and

wherein the absorbent material located within the voids is expandable into the voids.

47. The method of Claim 46 wherein the first fibrous slurry further comprises a wet
strength agent.

48. An absorbent article comprising an absorbent composite comprising a fibrous
matrix containing absorbent material,

wherein the fibrous matrix comprises bonded cellulosic fibers, wherein the fibrous matrix
includes voids and passages between voids within the matrix;

wherein the absorbent material is located within some of the voids; and

wherein the absorbent material located within the voids is expandable into the voids.

49. An absorbent article comprising:

liquid pervious topsheet;

a storage layer comprising an absorbent composite comprising a fibrous matrix
containing absorbent material,

wherein the fibrous matrix comprises bonded cellulosic fibers, wherein the fibrous matrix
includes voids and passages between voids within the matrix;

wherein the absorbent material is located within some of the voids; and

wherein the absorbent material located within the voids is expandable into the voids; and

a liquid impervious back sheet.

50. An absorbent article comprising:

a liquid pervious topsheet;

an acquisition layer for rapidly acquiring and distributing liquid;

a storage layer comprising an absorbent composite comprising a fibrous matrix containing absorbent material,

wherein the fibrous matrix comprises bonded cellulosic fibers, wherein the fibrous matrix includes voids and passages between voids within the matrix;

wherein the absorbent material is located within some of the voids; and

wherein the absorbent material located within the voids is expandable into the voids; and

a liquid impervious back sheet.

51. An absorbent article comprising:

a liquid pervious topsheet;

an acquisition layer for rapidly acquiring and distributing liquid;

a storage layer comprising an absorbent composite comprising a fibrous matrix containing absorbent material,

wherein the fibrous matrix comprises bonded cellulosic fibers, wherein the fibrous matrix includes voids and passages between voids within the matrix;

wherein the absorbent material is located within some of the voids; and

wherein the absorbent material located within the voids is expandable into the voids;

an intermediate layer interposed between the acquisition layer and the storage layer; and

a liquid impervious back sheet.

52. The absorbent article of Claim 51 wherein the intermediate layer is selected from the group consisting of a liquid pervious tissue and a distribution layer.

53. The absorbent article of Claim 49 wherein the article is a feminine care product.

54. The absorbent article of Claim 48 wherein the article is selected from the group consisting of a diaper and an incontinence product.

55. The absorbent articles of Claim 48 further comprising leg gathers.

56. An absorbent article comprising:

a liquid pervious topsheet;

an acquisition layer for acquiring and distributing liquid;

a storage layer; and

a liquid impervious back sheet;

wherein the acquisition layer comprises an absorbent composite comprising a fibrous matrix containing absorbent material,

wherein the fibrous matrix comprises bonded cellulosic fibers, wherein the fibrous matrix includes voids and passages between voids within the matrix;

wherein the absorbent material is located within some of the voids; and

wherein the absorbent material located within the voids is expandable into the voids.

57. The absorbent article of Claim 56 wherein the acquisition layer has a top surface area less than the top surface area of the storage core.

58. The absorbent article of Claim 56 wherein the acquisition layer has a top surface area about equal to the top surface area of the storage core.

59. The absorbent article of Claim 56 wherein the storage layer comprises an absorbent composite comprising a fibrous matrix and absorbent material,

wherein the fibrous matrix defines voids and passages between voids distributed substantially throughout the matrix;

wherein the absorbent material is located within some of the voids; and

wherein the absorbent material located within the voids is expandable into the voids.

60. An absorbent composite, comprising absorbent material dispersed within a fibrous matrix,

wherein the fibrous matrix includes voids and passages between voids distributed substantially throughout the matrix;

wherein absorbent material is located within some of the voids;

wherein the absorbent material is expandable into the voids; and

wherein the fibrous matrix comprises from about 20 to about 90 weight percent of fibers, based on the total weight of the matrix.

61. The composite of Claim 60, wherein the absorbent material is present in an amount from about 5 to about 60 percent by weight of the composite.

62. The composite of Claim 60, wherein the absorbent material is present in an amount from about 30 to about 50 percent by weight of the composite.

63. The composite of Claim 60, wherein the absorbent composite further comprises a wet strength agent.

64. The composite of Claim 63, wherein the wet strength agent is present in an amount from about 0.01 to about 2 weight percent based on the total weight of the composite.

65. The composite of Claim 63, wherein the wet strength agent is present in an amount from about 0.1 to about 1 weight percent based on the total weight of the composite.

66. The composite of Claim 63, wherein the wet strength agent is present in an amount from about 0.3 to about 0.7 weight percent based on the total weight of the composite.

67. The composite of Claim 60, wherein the fibrous matrix comprises of synthetic fibers.

68. The composite of Claim 67, wherein the synthetic fibers comprise from about 20 to 90 weight percent of the total weight of the composite.

69. The composite of Claim 60, wherein the fibrous matrix comprises stiffened cellulose fibers.

70. The composite of Claim 60, wherein the composite has a density of from about 0.02 to about 0.7 g/cm³.

71. The composite of Claim 60, wherein the composite has a density of from about 0.04 to about 0.3 g/cm³.

72. The composite of Claim 60, wherein the composite has a density of from about 0.1 to about 0.5 g/cm³.

73. The composite of Claim 60, wherein the composite has a dry tensile strength of from about 0.15 to 0.66 Nm/g.

74. The composite of Claim 60, wherein the composite comprises from about 50 to about 70 weight percent of fibers based on the total weight of the composite.

75. An absorbent article, comprising an absorbent composite comprising absorbent material dispersed within a fibrous matrix,

wherein the fibrous matrix includes voids and passages between voids distributed substantially throughout the matrix;

wherein the absorbent material is located within some of the voids;

wherein the absorbent material located within the voids is expandable into the voids, and

wherein the fibrous matrix comprises from about 20 to about 90 percent by weight fibers based on the total weight of the matrix.

76. An absorbent article, comprising :
liquid pervious topsheet;
a liquid impervious back sheet; and
a storage layer intermediate the topsheet and backsheet, the storage layer comprising an absorbent composite comprising absorbent material dispersed within a fibrous matrix,
wherein the fibrous matrix includes voids and passages between voids distributed substantially throughout the matrix;
wherein the absorbent material is located within some of the voids;
wherein the absorbent material located within the voids is expandable into the voids, and
wherein the fibrous matrix comprises from about 20 to about 90 percent by weight fibers based on the total weight of the matrix.

77. An absorbent article, comprising:
a liquid pervious topsheet;
a liquid impervious back sheet;
an acquisition layer for rapidly acquiring and distributing liquid; and
a storage layer intermediate the topsheet and backsheet, the storage layer comprising an absorbent composite comprising absorbent material dispersed within a fibrous matrix,
wherein the fibrous matrix includes voids and passages between voids distributed substantially throughout the matrix;
wherein the absorbent material is located within some of the voids;
wherein the absorbent material located within the voids is expandable into the voids, and
wherein the fibrous matrix comprises from about 20 to about 90 percent by weight fibers based on the total weight of the matrix.

78. An absorbent article, comprising:
a liquid pervious topsheet;

a liquid impervious backsheet;
an acquisition layer for rapidly acquiring and distributing liquid;
an intermediate layer interposed between the acquisition layer and the storage layer; and
a storage layer intermediate the topsheet and backsheet, the storage layer comprising an absorbent composite comprising absorbent material dispersed within a fibrous matrix,
wherein the fibrous matrix includes voids and passages between voids distributed substantially throughout the matrix;
wherein the absorbent material is located within some of the voids;
wherein the absorbent material located within the voids is expandable into the voids, and
wherein the fibrous matrix comprises from about 20 to about 90 percent by weight fibers based on the total weight of the matrix.

79. An absorbent article, comprising:

a liquid pervious topsheet;
an acquisition layer for acquiring and distributing liquid;
a storage layer; and
a liquid impervious backsheet;
wherein the acquisition layer comprises an absorbent composite comprising absorbent material dispersed within a fibrous matrix,
wherein the fibrous matrix includes voids and passages between voids distributed substantially throughout the matrix;
wherein the absorbent material is located within some of the voids;
wherein the absorbent material located within the voids is expandable into the voids, and
wherein the fibrous matrix comprises from about 20 to about 90 percent by weight fibers based on the total weight of the matrix.

80. An absorbent composite having a fibrous matrix containing absorbent material,

wherein the fibrous matrix includes voids and passages between voids distributed substantially throughout the matrix;

wherein absorbent material is located within the voids; and

wherein the voids are formed by drying absorbent material swollen with water during the formation of the composite.

81. An absorbent composite having a fibrous matrix containing absorbent material, the composite being formed by the process comprising:

(a) contacting a foraminous support with a combination of cellulosic fibers, water, and absorbent material swellable in water to provide a wet composite, wherein the wet composite comprises cellulosic fibers, water, and absorbent material swollen with water; and

(b) drying the wet composite, wherein drying comprises removing at least a portion of the water from the swollen absorbent material to provide an absorbent composite having a fibrous matrix containing absorbent material, wherein removing at least a portion of water from the swollen absorbent material causes the absorbent material to decrease in size to create voids distributed substantially throughout the matrix.

82. An absorbent composite, comprising a fibrous matrix containing absorbent material, the composite having a top surface, a bottom surface, length, width, and thickness,

wherein the fibrous matrix includes voids and passages between voids distributed substantially throughout the matrix;

wherein absorbent material is located within some of the voids;

wherein the absorbent material is expandable into the voids; and

wherein no void extends through the composite's thickness from the top surface to the bottom surface.

83. An absorbent composite, comprising a fibrous matrix containing absorbent material, wherein the fibrous matrix comprises crosslinked cellulosic fibers, wherein the fibrous matrix includes voids and passages between voids within the matrix;

wherein the absorbent material is located within some of the voids; and

wherein the absorbent material located within the voids is expandable into the voids.

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